

Using insights from pragmatism to develop reforms that strengthen institutional competence for conserving biodiversity

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(This is the author's pre-print version of paper published in *Policy Sciences*, December 2015. The final publication is available at Springer via <http://dx.doi.org/10.1007/s11077-015-9222-0>.)

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Abstract

The poor performance of biodiversity institutions has prompted calls for reform. Adaptive governance has been promoted as a means of supporting improved biodiversity outcomes. However, incorporating adaptive elements into biodiversity governance has been a challenge. In particular, efforts to make institutions more 'adaptive' often fail to account for existing capacity and context-specific factors. Clear guidance on how to move from general, ambitious adaptive governance prescriptions to specific, context-dependent recommendations is needed. This paper demonstrates how insights from pragmatism can inform an approach for designing institutional reforms that address current shortcomings in adaptive governance approaches. This design scaffolds reform options on a platform of existing competency and institutional legacy. Informed by the results of a prior institutional diagnosis, reform development followed a three-stage process: defining plausible reform spaces; identifying reform possibilities within these spaces; and elaborating reform options. Two very different landscapes provided the case studies: a highly modified agricultural

landscape, where private landholders are responsible for managing biodiversity as a public good; and a group of national parks, where the state holds primary responsibility. The reforms in the agricultural landscape build on successful landholder and organizational efforts to self-organize and pursue innovative solutions, while those for the protected area enable greater managerial discretion and address the challenges of working across multiple government jurisdictions. This context-driven approach draws on insights from pragmatism to provide guidance on the design of institutional reforms that meet the demands of adaptive governance in a way that is both systematic and realistic.

Keywords

Adaptive governance, biodiversity conservation, multifunctional landscapes, institutional reform, protected areas, private land conservation

Acknowledgement

This research is an output from the Landscapes and Policy Research Hub. The hub is supported through funding from the Australian Government's National Environmental Research Program and involves researchers from the University of Tasmania (UTAS), The Australian National University (ANU), Murdoch University, the Antarctic Climate and Ecosystems Cooperative Research Centre (ACE CRC), Griffith University and Charles Sturt University (CSU).

1 Introduction

Governance reform is needed to more effectively address the causes of biodiversity decline. Although biodiversity conservation has been codified in formal institutional frameworks for several decades, the rapid rate of biodiversity loss continues and is even increasing (Butchart et al. 2010). Failure to avert biodiversity losses has been attributed to an overemphasis on threatened species and ecological communities in biodiversity institutions, without adequate consideration of landscape-scale ecological processes (Bennett et al. 2009; Benson 2012). Shifting to a landscape-scale approach is not the only change needed. Increasing pressures, such as climate change, mean adaptation needs to be embedded in biodiversity institutions (Burch et al. 2014). The interactions between socio-economic and environmental systems also require formal and informal institutions capable of anticipating and responding to complex and often uncertain dynamics and solutions appropriate for the local context. Such challenges are not effectively addressed by traditional efficiency-driven, centralized environmental governance systems (Brunner 2010; Hill et al. 2013; Chaffin et al. 2014).

Adaptive governance (AG) has been promoted as a desired objective for institutional reform, under the premise that it offers principles for decision-making better equipped to cope with the inherent uncertainty and complexity of social-ecological systems through a more experimental, learning-driven approach (Brunner 2010; Chaffin et al. 2014). It also calls for multi-layered governance networks that foster learning, build social capital, and link across vertical and horizontal scales (Armitage et al. 2012; Lebel et al. 2006; Folke et al. 2005; Dietz et al. 2003). Buffering is an important feature of AG, referring to the ability to respond adequately to ecological threats, mitigate external pressures (e.g. market forces), and cope with uncertainty (Boyd and Folke 2011).

Despite enthusiasm for AG in the environmental governance literature, implementation of adaptive systems in practice remains slow, in part because its prescriptions often fail to account for the institutional impediments experienced by governance actors (Rijke et al. 2012; Ojha et al. 2013). AG has also been criticized for its normative focus on adaptability and transformability as necessary characteristics to achieve desired ecosystem states (Nelson et al. 2007). Although AG can be seen as a set of value-neutral features of governance where actors decide what the desired end goal is, this has often not been the case in the AG literature (Chaffin et al. 2014).

AG developed out of the systems thinking/resilience literature, where institutions are seen as critical influences on the capacity of actors to adapt to ecological change. At the same time, this literature offers little guidance as to how intentional design can foster more 'adaptive' institutions, especially since they are mainly viewed statically, as impediments to change (Matthews and Sydneysmith 2010). AG's resilience roots have also led to a strong focus on scientific understanding of the system. Conversely, it has also meant under-engagement with how the institutional context and socio-political factors influence decision-making, problem-solving, and other elements of capacity and adaptive capacity (Voß and Bornemann 2011; Matthews and Sydneysmith 2010; Wyborn 2015). While AG can occur in spite of the constraining forces of institutions and productively build on institutional legacy (Schoon 2013), there is little guidance on how institutional designers can build on present coping capacities as well as enhance institutional capacity to anticipate and adapt to future environmental changes (Berman et al. 2012).

The aim of this paper is to demonstrate the potential of a pragmatist approach to designing adaptive biodiversity conservation institutions, and specifically with the purpose of addressing weaknesses in current adaptive governance approaches. A pragmatist perspective, along with congruent concepts from the institutional change literature, provides new guidance on how institutional design can be oriented toward large-scale institutional change. A pragmatist approach ensures attention is paid to institutional legacy as a platform for reforms, thereby providing continuity between past and future. Specifically, the concept of scaffolding provides guidance on how to use existing capacity and institutional structures as platforms, while adding new institutional elements addressing context-specific needs in designing reform options. Our approach considers how reforms can build adaptive capacity, or the ability of institutions to withstand and respond to change (Armitage and Plummer 2010). It also attends to more general capacity, or the ability to identify and solve problems and deploy knowledge and skills (Virji et al. 2012), and refers to them both under the umbrella concept of competence (Ansell 2011).

Our demonstration focuses on two case studies: a highly modified agricultural landscape, where private landholders are responsible for managing biodiversity as a public good; and a largely natural protected area where the state holds primary responsibility. The next section introduces concepts from AG and pragmatism, as well as congruent insights

from the institutional change literature that informed development of the staged approach to designing reforms (Section 3) and the reform options (Sections 4 and 5).

2 Institutions, institutional change and pragmatism

Competence to conserve biodiversity under times of rapid environmental change requires flexibility and reflexivity. Institutions can provide the basis for this capacity, but such dynamics are antithetical to those normally attributed to institutions (Goodin 1996). Institutions are comprised of regulative, normative, and cultural-cognitive elements. They structure, stabilize, and provide meaning to social life, and shape the structure and identities of organizations and individuals (Scott 2014). While institutions are capable of both abrupt and gradual change, they also have strong status quo biases and path dependencies, making radical change a rarity and a challenge for planned design (Scott 2014; Young 2008). Yet as a direct challenge to traditional modes of governance, AG is often said to require more radical, transformative change (e.g. Olsson et al. 2006; Westley et al. 2011; Chaffin et al. 2014), but such change is difficult to design.

Institutional reform efforts must be informed by an understanding of institutions and how they change. Many models that seek to provide understanding exist. Such models tend to incorporate the degree of change (incremental or radical) and its pattern (continuous or discontinuous). Punctuated equilibrium (Baumgartner et al. 2014) and critical juncture (Thelen 1999) models help explain how abrupt, radical change (e.g. new policy directions, changes in fundamental assumptions about the problem) can follow prolonged periods of relative stability, but are less useful for understanding incremental change and how actors decide which changes to make (Campbell 2010). Incrementalist literatures (e.g. Lindblom 1990; North 1990) have practical appeal because the case evidence demonstrates that consensus on small adjustments can be readily achieved. However, incremental reforms tend to reinforce the status quo and largely maintain current policy directions (Ansell 2011). Maintaining current policy directions could have dire consequences, given the effects of biodiversity loss are so significant on ecosystem functioning and human prosperity that it now ranks as one of the most significant global drivers of environmental change (Cardinale et al. 2012).

Pragmatist perspectives, and similar theories within the institutional change literature, suggest there is a path between the slow grind of incrementalism and abrupt

transformations that are difficult to engineer. Pragmatist philosophy combines incremental, systematic, and reflective elements in the pursuit of change. Accepting that large-scale change is not designed, change instead scaffolds on institutional competency, is mindful of institutional legacy, and explicitly aims toward a larger-scale goal (Ansell 2011). Design efforts do not take place in institutional 'greenfields', highlighting an imperative to be mindful of institutional legacy in designing reforms (Ansell 2011; Schoon 2013). Although this legacy may hinder achievement of an ideal model of governance, it also provides the institutional memory and baseline capacity for reformed arrangements.

This idea of cultivating existing competencies while also reorienting governance toward a new direction has similarities to *bricolage* and translation theories of institutional change. *Bricolage* explains how institutional changes occur through processes that combine and recombine existing institutional elements (Campbell 2004), and suggests that institutional arrangements are always a combination of new and old (Cleaver 2012). New elements can be added in a process of diffusion and then translation, where new concepts are introduced by institutional entrepreneurs and modified to fit local institutions, and thus contribute to more radical change (Campbell 2004, 2010). Similarly, pragmatism describes how new elements are integrated or used to reconstruct habit (Ansell 2011).

Pragmatism suggests existing elements combined with new institutional elements can be used to guide reforms, through scaffolding and the pursuit of larger-scale institutional goals (in this case AG). These dynamics build on the understanding of *bricolage* and translation, as they use existing elements and introduce new ones that can be adapted by actors in the local context. It also offers a way to modify AG prescriptions. For example, pragmatist insights in public administration have informed governance models that share some elements with AG but consider more carefully the administrative limits of managing public problems, like democratic experimentalism (Sabel and Zeitlin 2010) and collaborative governance (Ansell and Gash 2008). Pragmatist thinkers recognize too much flexibility can be problematic, as can overly rigid rules. Thus, this literature also explores how competence to reflect, learn, solve problems, collaborate, and act responsibly in the public interest can be cultivated (Selznick 2002). Building on these pragmatist and institutional theories of change, this research outlines a staged approach to designing institutional reforms that scaffolds on existing competencies while using AG as an aspirational endpoint.

3 Developing the reforms

The overarching research design for this study was a case study methodology, with a three-stage approach in which multiple methods were used for data collection (Yin 2009). The Tasmanian Midlands and Australian Alps were selected as contrasting case studies to reflect the globally diverse challenge of biodiversity conservation. Given the former is largely state-owned and managed protected area and the latter privately owned agricultural land, they face different governance dilemmas and require different designs. Reform development was in three stages: 1) identifying the *reform space and requirements* bounding the extent of reform possibilities; 2) developing a *reform map* depicting the range of possibilities within this space; and 3) selecting and developing two *reform options* for each case study from the range of possibilities (Figure 1). The data collection methods deployed in each stage are indicated in Table 1.

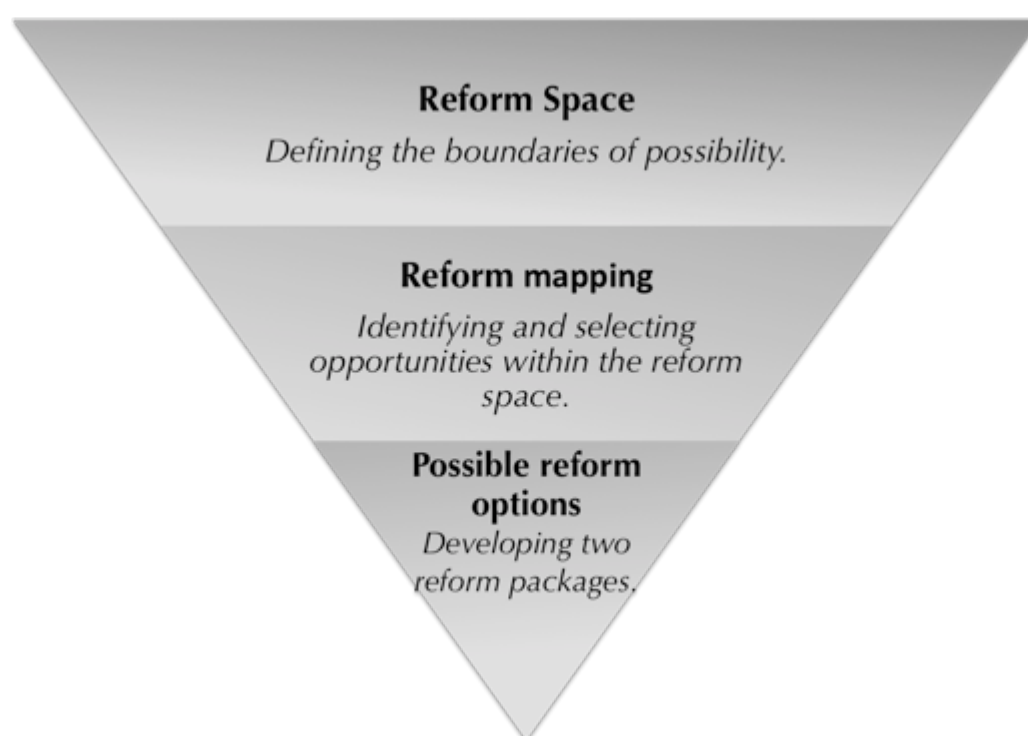


Figure 1 Three stages of reform development

The sources indicated in Table 1 were used in an iterative way and in several stages, thereby developing the reform options using multiple sources of evidence. Knowledge of the case study regions obtained from published material and the authors' previous work in these regions were the main sources of information for stage 1, and made a more limited contribution to stages 2 and 3 (Table 1, column 2). Good-practice case studies, largely

informing stage 2 (Table 1, column 3), were identified primarily through keyword literature searches. AG and pragmatist insights on institutional theory and public administration informed the reform mapping (stage 2) and were particularly influential in the development of reform options (stage 3) (Table 1, column 4).

Table 1 Relationship between stages of reform development and methods

Methods/ Research Stages	Regional and national context	Literature (good-practice case studies)	Literature (theory)	Diagnostic (framework and interviews)	Focus groups
<i>Stage 1. Reform space</i>	Key Source	---	Secondary Source	Secondary Source	---
<i>Stage 2. Reform mapping</i>	Secondary Source	Key Source	Secondary Source	Key Source	---
<i>Stage 3. Possible reform options</i>	Secondary Source	Secondary Source	Key Source	Key Source	Key Source

Results from the development and application of a diagnostic framework (Clement et al. 2015, under review) (Table 1, column 5), were used to inform all three stages. An institutional diagnostic assesses the salient elements of the policy problem of interest, from a social and ecological perspective, to identify shortcomings and recommend potential areas of reform. Using the concept of ‘fit’, the diagnosis, as applied in this study, identified whether institutions associated with biodiversity conservation in the two study regions were able to address the temporal, spatial, and functional aspects of the ecosystems being managed, as well as cultural-cognitive dimensions of institutions (e.g. framing, culture).

The diagnostic framework employed in this study drew on AG, pragmatism and related institutional theory. The four areas of focus for diagnosis were the problem and players, politics, competence and capacity (Figure 2) (Clement et al. 2015, under review). The framework provided a structure for collecting and interpreting data from interviews with key stakeholders associated with biodiversity conservation in each study region – 49 respondents from the Midlands and 51 from the Australian Alps (Tables 2 and 3). This diagnosis was particularly valuable in determining possible reform options and the institutional elements that could be used to scaffold reform (Table 1, Stage 3). The focus groups method (Table 1, column 6) is discussed below as part of Stage 3.

Stage 1 (reform space) drew on the regional and national context of the case studies to define a reform space. This was the space within which plausible reforms could occur, recognizing that, while some elements are amenable to re-design, the choice of institutional

arrangements is limited by the social, ecological and institutional context in which they are embedded (Hollingsworth 2000; Cleaver 2012).

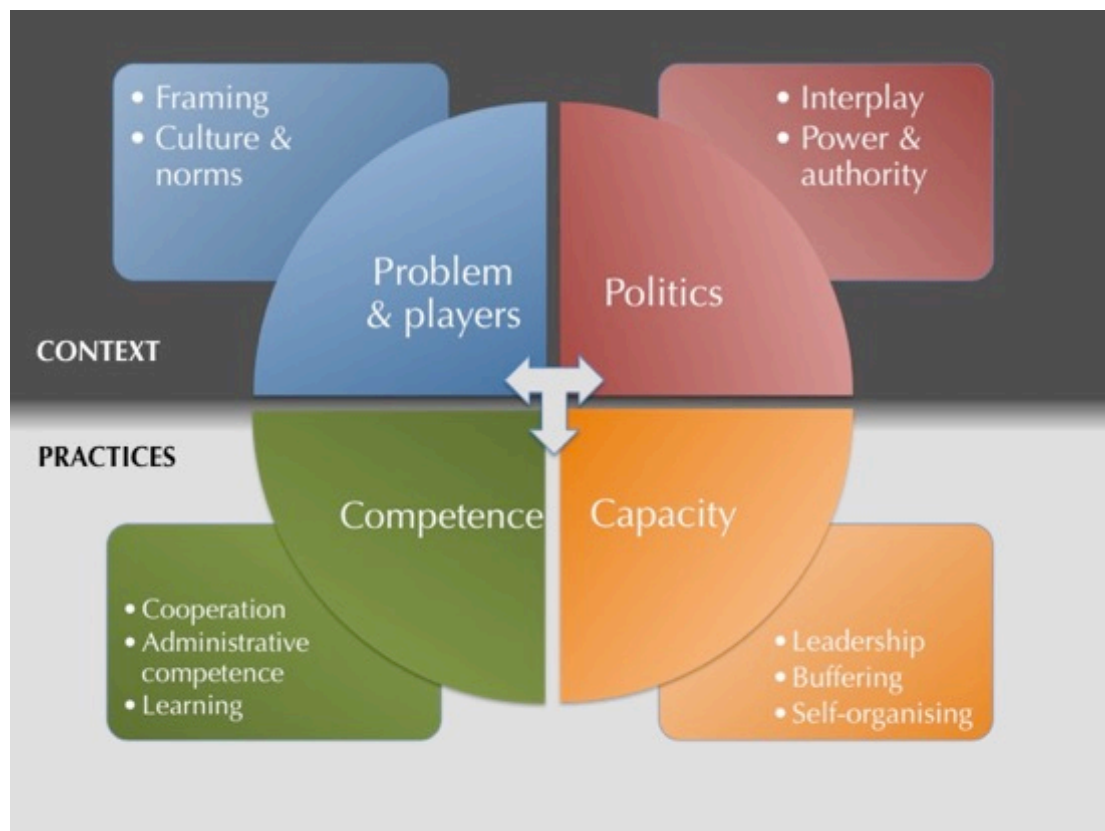


Figure 2 Diagnostic framework (Clement et al. 2015, under review)

Table 2 Interview and focus group participant affiliations (Tasmanian Midlands)

	Interviews	Focus Groups		
	Feb – Apr 2013	I 17 Feb 2014	II 18 Feb 2014	III 21 Feb 2014
Government officials				
- Federal	11	1	0	8
- State (Tasmania)	9	0	6	0
- Regional NRM groups	3	1	1	0
- Local	3	0	0	0
Non-government officials and representatives				
- Agriculture-related	2	1	0	0
- Conservation-related	7	2	1	0
Other				
- Local farmers/grazers	6	3	0	0
- Researchers	5	0	1	0
- HydroTasmania	2	0	0	0
- Consultant	1	0	0	0
TOTAL	49	8	9	8

Table 3 Interview and focus group participant affiliations (Australian Alps)

	Interviews	Focus Groups	
	Apr - May 2013	I 19 Feb 2014	II 13 Mar 2014
Government officials			
- Federal ¹	7	0	0
- State & Territory (NSW, VIC & ACT)	27	5	5
- Regional (NRM)	2	0	1
- Local	2	0	0
Non-government officials and representatives			
- Tourism-related	2	1	0
- Conservation-related	2	0	0
Other			
- Researchers & consultants ²	9	1	2
TOTAL	51	7	8

¹ Five of these people also discussed the Midlands in their interviews. Between the two case studies, 13 federal government officials were interviewed.

² Two researchers also discussed issues relevant to the Midlands.

Stage 2 (reform mapping) was informed by good-practice case studies, to suggest what was possible, as well as to advise how the issues identified through the diagnosis could be addressed. An understanding of context also influenced the reform mapping, and theory was used to stretch thinking about plausible future possibilities. The reform maps were meant as a heuristic device to spark discussion and debate about options. From these possibilities, two options were selected for further elaboration, based on those that could best address the findings from the diagnostic framework and associated interviews and for which there were strong examples in the case literature.

Stage 3 (possible reform options) centered on drafting and refining governance reforms; two for each case study region. Once designed and drafted using information from the first two stages, feedback on the reforms was obtained via five focus groups (Table 1, column 6). The three Midlands focus groups comprised: (i) agricultural interests and those working directly with landholders; (ii) Tasmanian Government actors; and (iii) federal government actors (Table 2). The Alps focus groups mainly comprised participants from state government agencies with responsibility for land management (Table 3). The focus groups addressed the following questions: did the options adequately address key issues identified in the diagnosis; were the options realistic; and were there other ways governance could be improved? The sampling logic for focus groups was purposive (Minichiello 1995; Creswell 2013) with participants for each focus group selected to ensure enough homogeneity to limit conflict, while ensuring sufficient diversity across all focus groups to canvas a range of views from key actors (Stewart et al. 2007).

Stage 3 concluded with revision of the reform options by the authors of this paper to address feedback from each focus group. Recognizing there are multiple pathways to achieving reform, feedback was accommodated where possible, but moderated so that the revised options still addressed identified weaknesses, accounted for the public good characteristics of biodiversity, and were informed by the principles of good governance (Lockwood 2010).

4 Tasmanian Midlands reforms: Landholder duty of care for biodiversity in a multifunctional landscape

4.1 Reform space

The Tasmanian Midlands (Figure 3) has a reform space defined by the features of the region relevant to biodiversity governance, Australia's system of cooperative federalism, and the public good characteristics of biodiversity (Table 4). Biodiversity features are held almost exclusively on private property in this agricultural landscape, which is designated as a national biodiversity hotspot under threat (Department of the Environment 2009). Native grasslands, including the federally listed, critically endangered Lowland Native Grasslands, are among the key biodiversity features in this region.

In the past, reliance on native grasslands for wool production has helped conserve these ecosystems, but increasing agricultural intensification and irrigation now threaten their survival. Dramatic declines in commodity prices have already driven diversification into more intensive agriculture, with government investment in the Midlands Water Scheme (MWS) expected to further this trend. In a region where native vegetation is less than 30 per cent of its original extent, fragmented, and often in poor condition (Sattler and Creighton 2002), the development of the MWS is potentially significant at a landscape scale. The impacts of the MWS are likely to include both listed species and native vegetation more generally, through conversion of grassland ecosystems into irrigated cropping, dairy and horticultural enterprises (Mitchell et al. 2014).

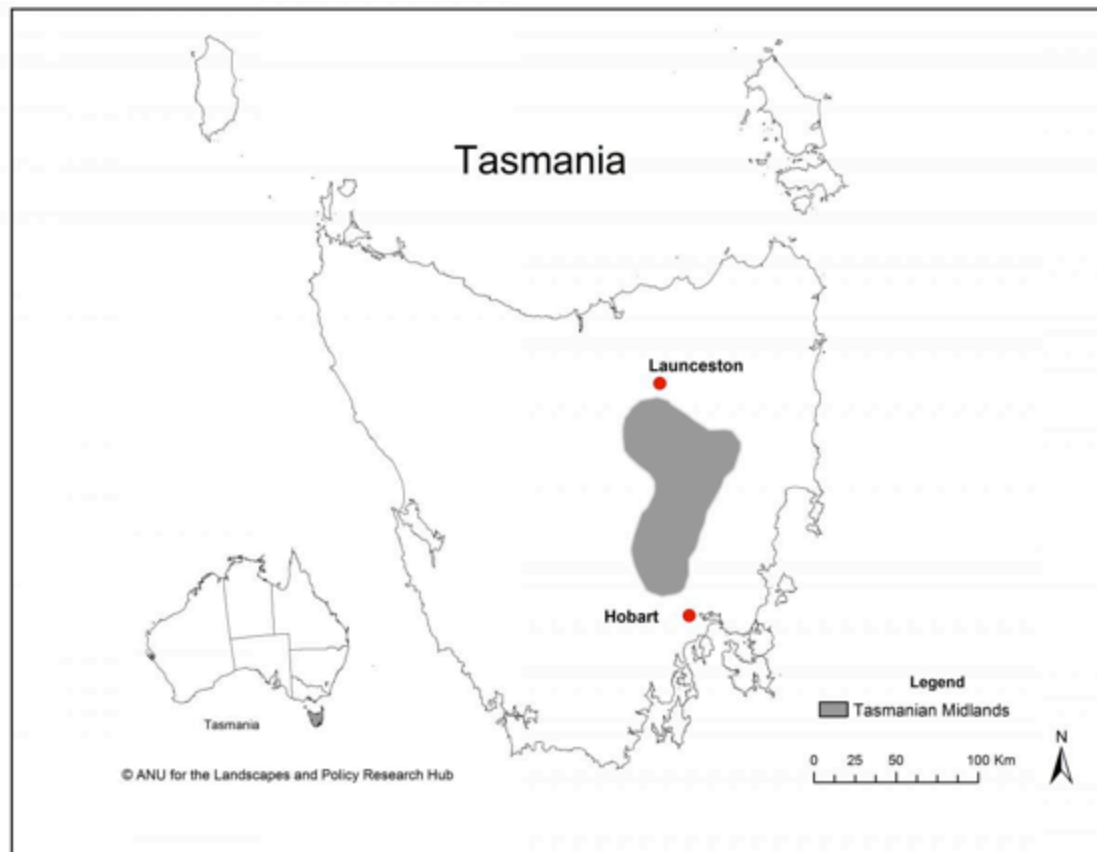


Figure 3 Location of the Tasmanian Midlands region

Non-regulatory instruments are increasingly favored as mechanisms to influence private landholder behavior in the Midlands, mirroring worldwide trends (Doremus 2003). The Protected Areas on Private Land Program is a long-standing example, in which the Tasmanian Department of Primary Industries, Parks Water and Environment (DPIPWE) offers incentives for voluntary adoption of covenants and management agreements (DPIPWE 2013). Conventional approaches have been complemented in recent years by more innovative solutions. For example, the Midlandscapes program focuses strategically across the whole bioregion. It operates under a 'Conservation Action Plan' shared by the Tasmanian Land Conservancy, Bush Heritage Australia, and Greening Australia, all non-government organizations (NGOs). The initiative includes the Midlands Conservation Fund, a perpetual fund providing stewardship payments to farmers who enter an outcome-based agreement.

Self-organizing networks are an important institutional feature in the Midlands. For example, a group of three landholders established the Tasmanian Rangelands Group, inspired by the Malpai Borderlands Group of ranchers in the United States, which aims to create a 'radical center' that discards the dichotomy between conservation and production,

and seeks to make them symbiotic (Sayre 2005). The Tasmanian network is negotiating with government agencies, environmental NGOs and philanthropists to make biodiversity conservation a financially viable proposition on working farms, but has yet to successfully institutionalize their efforts. The Midlands Coordination Group is another developing network of environmental NGOs and government representatives, seeking to better organize and target the diverse range of conservation initiatives in the region.

In addition to the Midlands context, the nature of Australian governance and the place of biodiversity in these systems influenced the boundaries of the reform space (Table 4). Under Australia's Constitution, state governments are responsible for land and biodiversity management, as moderated by heads of power that allow the federal government to assume responsibility, for example, for meeting international obligations under the *Convention on Biological Diversity* (CBD). These arrangements have constrained the devolution of responsibility to landholders for setting biodiversity conservation objectives, while at the same time maintaining expectations that landholders, with government support, will deliver outcomes.

Table 4 Institutional elements bounding reform options in the Tasmanian Midlands

Institutional element	Implications for governance options
Under the Australian Constitution, states have responsibility for land management and its biodiversity; history suggests constitutional change in Australia is difficult (Bates 2010).	Changing allocation of governance and planning responsibilities would require a formal agreement between the Tasmanian and federal governments. Federal regulatory powers are limited by the Constitution. Federal listing of threatened species and ecological communities under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth) (EPBC Act), providing strategic guidance, and financial incentives are important roles.
Biodiversity is a public good but is tied to land tenure, with the Midlands predominantly under private ownership.	Reform options are constrained by the fact that land tenure will remain private (i.e. biodiversity values will not be decoupled from the private land on which they sit).
Australia has a predominantly neoliberal political philosophy and direct regulation is generally viewed as an infringement on private property rights (Lockie and Higgins 2007). Duty of care for biodiversity tends to be adopted through market-based rather than statutory mechanisms (Earl et al. 2010).	Further limitations on private property rights are unlikely to be supported in the short to medium term, and most land use decisions will remain in the hands of landholders. Reform measures such as duty of care legislation would be difficult in the absence of property rights reform (Brennan 2004).
Agriculture is an important part of the social and economic fabric of the Midlands.	Any large-scale land use changes will have significant consequences for the long-term social and economic viability of the region. Options integrating multiple values will have better chances of success.

4.2 Reform mapping

Having established a potential reform space, good-practice case studies from the literature and results from the diagnostic and associated interviews were used to map governance options to guide development and selection of potential reforms. The reform space for the Midlands can be represented as a triangle, with the suite of options considered in terms of whether they favor government-, community- or market-oriented solutions. Current arrangements, with strong involvement by the Tasmanian and federal governments in biodiversity conservation in the Midlands, sit slightly closer to government-oriented solutions than market- or community-oriented ones (Figure 4).

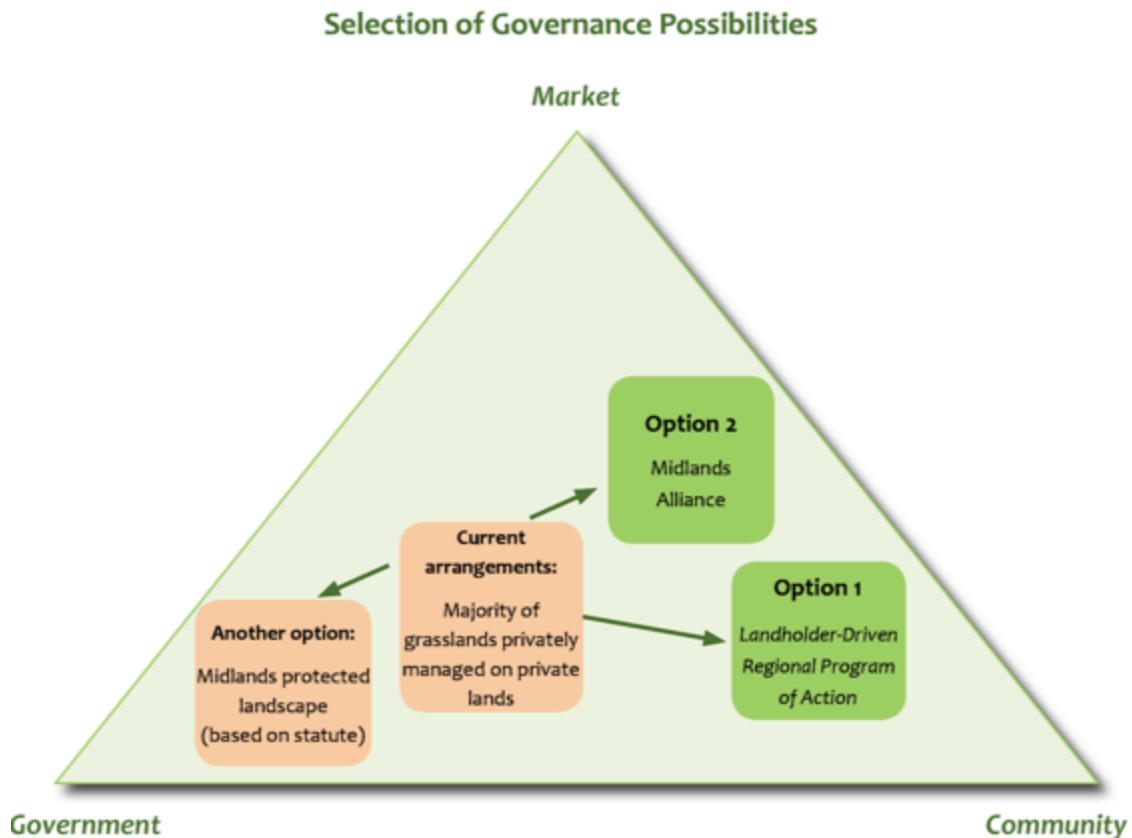


Figure 4 Map of governance possibilities for the Midlands¹

Analysis of European case studies suggested establishing the Midlands as a government-administered protected landscape (IUCN category V) (Borrini-Feyerabend et al. 2013) (Figure 4, orange box labeled “Another option”). However, the strong influence of neoliberal philosophy in Australia and lack of support from private landholders in the Midlands render this reform option less practical than those to the right side of the triangle (Figure 4), which provide a mix of government-, community- and market-oriented reform, while pushing towards options that facilitate broader community engagement.

The increased community engagement focus of Options 1 (Landholder-driven Program) and 2 (Midlands Alliance) (Figure 4, green boxes) is supported by theoretical and case literature, as well as the strengths and weaknesses of the current institutions as identified by the institutional diagnosis (Table 5). Case study literature suggests robust

¹Adapted from a representation of natural resource governance in Australia (Lockwood and Davidson 2010). The options that were selected are shown in green.

natural resource governance can be achieved through self-organized networks (Ostrom 2009), although these case studies focus on common pool resource situations. Central oversight is likely more important in biodiversity governance (Ring 2008). A more explicit, legally defined duty of care for biodiversity would support provision of this public good, with flexibility to adapt to local conditions and environmental change (Earl et al. 2010).

Existing institutional conditions in the Midlands are amenable to reform options in the more community- and market-oriented space. Importantly, governance possibilities here can build on the strong institutional legacy of participation in conservation programs and recent efforts to self-organize. To achieve regional outcomes will require expanding engagement to develop broader alliances both in terms of membership and geographic scope (Kaljonen 2008). The focus on 'bottom-up' governance means Option 1 (Landholder-driven Program) is located towards the bottom right hand corner of the triangle in Figure 4.

Table 5 Summary of strengths and weaknesses identified in the diagnostic (Tasmanian Midlands)

Strengths	Weaknesses	Implications
<ul style="list-style-type: none"> • Governance actors recognize the value of approaching the Midlands as social-ecological system, and there is a desire to bring together the natural and human landscape elements. 	<ul style="list-style-type: none"> • Institutional arrangements neglect the need to address ecosystem function, and focus too narrowly on native vegetation in the absence of other landscape values and functions. 	<ul style="list-style-type: none"> • The region is a good candidate for pursuing landscape-scale approaches encompassing functional elements of biodiversity in a landscape characterized by agricultural land uses.
<ul style="list-style-type: none"> • Strong entrepreneurial leadership and a demonstrated willingness for policy innovations to address both the needs of landholders and requirements of biodiversity conservation (e.g. Midlands Conservation Fund, Tasmanian Rangelands Group). • Several attempts by landholders and NGOs to self-organize and create new approaches to conserve biodiversity. 	<ul style="list-style-type: none"> • A greater quantum and more diverse funding sources are needed to support these efforts. • Networks have struggled to institutionalize their initiatives and decision-making powers. 	<ul style="list-style-type: none"> • Governance should move away from overly prescriptive approaches to enable innovation, seek diverse sources of funding, and build on existing initiatives.
<ul style="list-style-type: none"> • Strong history of collaboration between a core group of landholders and key individuals within government and (more recently) environmental NGOs. • Midlands Coordination Group seeking to formalize this collaboration. 	<ul style="list-style-type: none"> • Collaboration has excluded some groups, and focused on a small subset of landholders. • There are many visions, but a shared vision covering a wide spectrum of views is lacking. 	<ul style="list-style-type: none"> • Collaboration provides a strong foundation for expanded efforts, but needs to be inclusive of all parties to develop and implement a landscape-scale approach.
<ul style="list-style-type: none"> • Use of strategic assessment under the EPBC Act to evaluate the impacts of irrigation represents an effort to take a landscape-scale approach. 	<ul style="list-style-type: none"> • Authority under the EPBC Act is weak and linked to endangered species, making strategic assessment a blunt instrument to address landscape-level impacts. • Poor buffering capacity to respond adequately to irrigation impacts, mitigate external pressures (e.g. market forces), and cope with uncertainty. 	<ul style="list-style-type: none"> • Strategic assessment is a mechanism already in legislation that could be used for landscape-scale approaches. • Need to build organizational and institutional buffering capacity.

Taking a more market-oriented view enabled placement of governance possibilities towards the top corner of the triangle (Figure 4, Option 2 Midlands Alliance). The extensive lessons learned from supporting multifunctional landscapes in Europe (Van Huylbroeck and Durand 2003; O'Farrell and Anderson 2010) suggested possibilities for reform addressing both the socio-economic and ecological dimensions of the region. Multifunctionality emerged inductively from the data as a goal orienting reforms, responding to the need to embed biodiversity conservation considerations within a broader agricultural context. Initiatives promoting multifunctional landscapes share the premise that rural land owners should be encouraged to enhance ecological values, while also fostering economic sustainability and economic and social capital (O'Farrell and Anderson 2010). Both options were deliberately located in the community-market reform space of Figure 4 to scaffold on the strengths of current approaches and address the constraints to adaptive, landscape-scale biodiversity governance.

4.3 Design of reform options

The reform were designed to transition current governance arrangements towards the two options, drawing on key findings from the diagnostic, supported by the literature, and moderated by the results from the focus groups. The most significant change arising from the focus groups was shifting one of the initial options more towards a 'bottom-up', self-organizing model, inspired by models of self-organized governance systems for irrigation (Cox and Ross 2011). Although there was general consensus that such a model was worth pursuing, there was of course differing views on how autonomy and oversight should best be balanced. To accommodate the public good nature of biodiversity as well as the interest in more autonomy, Option 1 starts as a landholder-driven model, but would need to proceed to broader community engagement and then develop a system of public oversight as part of the regional plan of action.

While drawing on the concepts of AG and multifunctional landscapes, both options also scaffold on the strengths of current arrangements. They offer a way to reconfigure institutional elements and provide support for innovations that have already been introduced, while also addressing current weaknesses.

The first option, the Landholder-Driven Regional Program of Action, was developed to build on the Tasmanian Rangelands Group, and to draw on their inspiration, the Malpai

Borderlands Group (Sayre 2005). Shifting the balance of power away from agencies toward shared decision-making with landholders has been a central goal in the Borderlands (York and Schoon 2011), and is incorporated into Option 1. The second option, the Midlands Alliance, is inspired by institutional arrangements for Regional Nature Parks in France combining environmental protection, including preservation of landscapes and natural and cultural heritage, and regional socio-economic development (Dupraz and Rainelli 2004; Bardsley and Pech 2012). This option also nudges governance toward market-based approaches, such as by encouraging accreditation schemes for agricultural produce.

Both options steer toward a fundamental re-framing of biodiversity conservation to explicitly integrate ecosystem function and the multiple social and ecological values of the Midlands landscape. Re-framing responds to the diagnostic findings that formal institutions are focused too narrowly on protecting endangered species and ecological communities, whereas there has been a shift in local views toward retaining and restoring ecosystem function in a 'working' agricultural landscape as a more appropriate goal. Re-framing of this sort is not only a more realistic goal in highly modified landscapes (Curtis and Lefroy 2010) but acknowledges that the paradigms of ecosystem management must change to cope with emerging novel ecosystem types (Hobbs et al. 2013). The principles behind multifunctionality underpin both options (Reyers et al. 2012), and provide guidance for reframing institutional arrangements beyond listed values toward more holistic solutions.

Option 1 seeks to provide rights and incentives to self-organize (Chapin III et al. 2012) and starts with a working group of local landholders and organizational representatives taking the lead in development of a comprehensive program of action, with seed funding provided by the state and federal governments. To address needs identified in the diagnostic (Table 5), this group would develop a regional program of action to: i) provide a shared vision; ii) identify priority values to enhance landscape functions; iii) identify planning and land use options; iv) provide a plan for implementation; and v) mechanisms for reflection and revision. This responds to the weaknesses of overly prescriptive agri-environmental schemes in Europe, and draws inspiration from the results-oriented approach of de Sainte Marie (2014).

Option 2 has a greater market emphasis through its focus on rural development and suggests a wider coalition from the outset, with government and non-government

organizations and landholders collaboratively pursuing development of an alliance. Building on current approaches, it would broaden membership in the Midlands Coordination Group to include more landholder representation and strengthen capacity to implement the Conservation Action Plan already in place. The alliance could be cemented in a charter ratified by the Tasmanian Parliament to formalize the approach and ensure democratic oversight of the process through the engagement of the parliament.

The diagnosis raised concerns that current institutional arrangements provide too little authority to buffer ecosystems and ensure the ongoing conservation of biodiversity in the public interest. Devolving more decision-making powers to landholders and adopting a more participatory approach would help address the weaknesses of the overly prescriptive and decontextualized approach to multifunctional landscapes in Europe (Lehmann et al. 2009). Devolution was a troubling prospect for some focus group participants; particularly government actors who need to ensure statutory responsibilities are met.

As a public good on private land, both reforms had to consider the requirement for some level of central authority and policy-setting in biodiversity governance (Ring 2008), while balancing this against the principle of subsidiarity and the need to be more responsive to conditions 'on the ground' (Paavola et al. 2009). Despite strong and widely-held stakeholder preferences for non-government, norm-based approaches, this highlights the need for a polycentric institutional design, with governments providing a space where landholder visions and strategies can be tested against the wider public interest including Australia's international responsibilities under the CBD.

While both options strive for more interactive governance (Torfing et al. 2012) and greater individual agency, biodiversity requires structures to ensure its delivery. The concept of situational contracting offers guidance for how this could be applied, particularly in Option 1. Drawing on experience in the Netherlands, the approach provides for greater agency and bottom-up decision-making within a structure (e.g. protocol) agreed upon by a plurality of interests (Wolfson 2012). Critically, it still includes oversight of a public gatekeeper and acknowledges even good faith efforts can fail, making it a good compromise between the more prescriptive approaches of the past and the fully flexible arrangements desired by some landholders.

Both options also encourage reliance on a portfolio of biodiversity conservation mechanisms and include liaison with and oversight by government actors to ensure the

programs deliver on biodiversity outcomes for the broader public good. The strategic behavior of landholders and strong emphasis on payment for conservation found in the diagnostic suggest economic incentives should be part of the mix if institutions are to have an effect. Both options scaffold on the existing Midlands Conservation Fund as one source of perpetual funding outside of government.

Under both options there is the opportunity to take a creative approach to the formal devolution of authority within the existing statutory framework. A regional planning exercise could be undertaken and then assessed and approved under strategic assessment provisions in Part 10 of the EPBC Act. A resultant regional program of action could then be developed and implemented under an agreement with the federal government to strategically consider the future of the Midlands as a multifunctional landscape – an advance on the recently completed MWS Strategic Assessment where the narrow terms of reference focused only on irrigation and precluded consideration of biodiversity values beyond narrowly defined matters of national significance (which focus on listed threatened species and communities). This takes advantage of an institutional change process of conversion, where repurposing rules can lead to significant institutional change (Mahoney and Thelen 2010).

Both options also focus on strategies to build buffering capacity. Case studies have shown successful buffering strategies include networking; objective setting, planning, and backup; and having vision and strategies for unknowns (O'Toole and Meier 2011; Termeer and van den Brink 2012; Boyd and Folke 2011). The formalized Alliance is one such buffer (Option 2), through clarifying and potentially formalizing management directions and responsibilities for the Midlands landscape. The landholder-driven Option 1 could have a similar buffering capacity if the networked governance associated with it is sufficiently engaged and robust to resist challenges to its authority.

5. Australian Alps reforms: Enhancing cross-border authority and enabling manager discretion

5.1 Reform space

The reform space for the Australian Alps is defined by features of the region relevant to biodiversity governance and Australia's system of cooperative federalism. The Australian Alps is a mountainous bioregion spanning the states of Victoria and New South Wales (NSW)

and the Australian Capital Territory (ACT) (Figure 5). It is unique in this relatively flat continent and is recognized internationally as a world center for plant diversity (Davis et al. 1994). Reserved as a series of national parks and federally listed as a National Heritage Place under the EPBC Act, its land tenure is secure, but its endemic alpine species still face threats from invasive plants and animals, climate change, and dwindling public resourcing for biodiversity conservation (Lockwood et al. 2014).

Like many bioregions, the Australian Alps landscapes are artificially fragmented by jurisdictional boundaries. Formal responsibility for land and biodiversity management rests with the state and territory park management and environmental agencies, and each jurisdiction has dozens of pieces of legislation that are relevant to conservation, presenting many of the same challenges seen in international transboundary protected areas. To address such challenges, the three state/territory jurisdictions and the federal government collectively run the Australian Alps National Parks Cooperative Management Program. Initiated by a group of park agency managers to increase cooperation across borders, the program has operated under a Memorandum of Understanding (MOU) since 1986 (Crabb and Dovers 2007). The program has a strategic plan outlining cooperative management activities and a central coordinating body, the Australian Alps Liaison Committee (AALC). Although this arrangement has been strong and flexible enough to survive political and funding cycles, major fire events, and contentious management issues such as cattle grazing in the Victorian Alps, it has struggled to effectively deal with some of the vexing cross-border issues impacting biodiversity (e.g. feral horses) (Crabb and Dovers 2007).

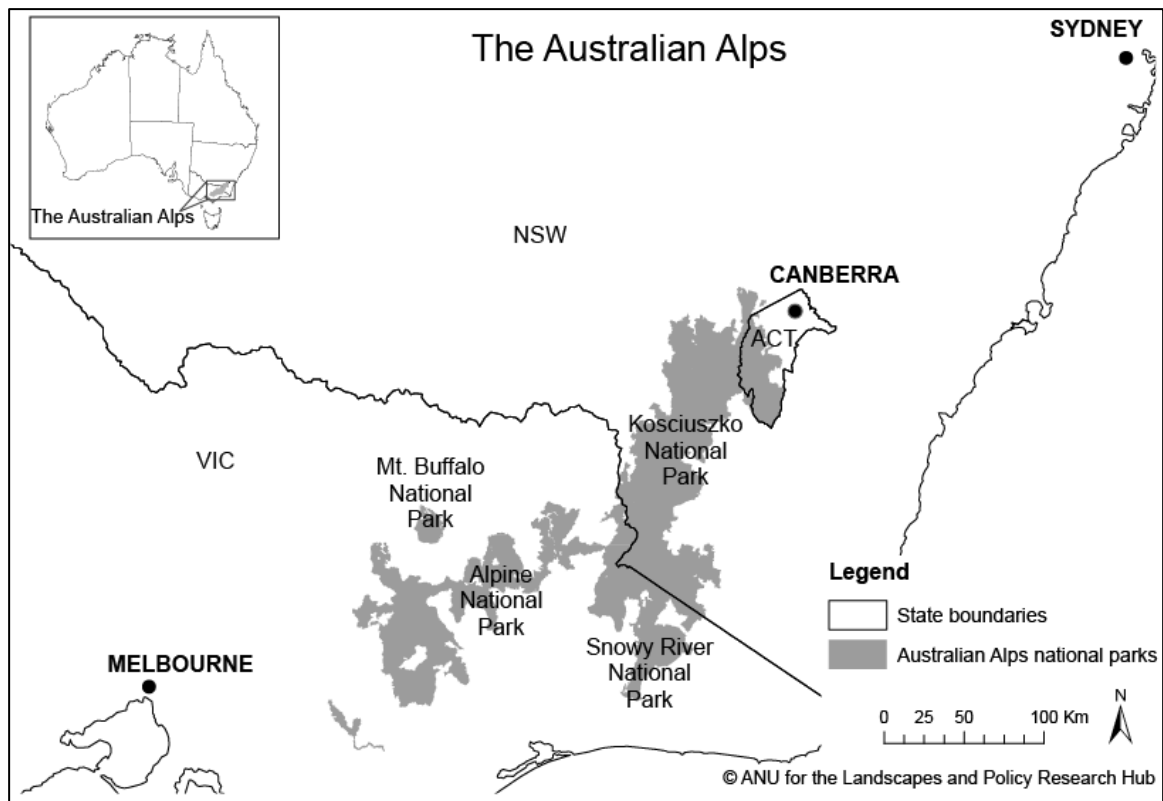


Figure 5 Location map of Australian Alps protected areas

The factors bounding the reform space, based on this knowledge of the case study region and how this influences governance design, are summarized in Table 6. Land tenure and the constitutional role of states in management of national parks were key considerations. While pursuit of options to enable truly ‘national’ national parks in Australia is technically possible, it is unlikely in the absence of strong political support from all jurisdictions and would not – by itself – address the issues identified in the diagnosis.

Table 6 Institutional elements bounding reform options in the Australian Alps

Institutional element	Implications for governance options
Under the constitution, the states have responsibility for land management, and history suggests constitutional change in Australia is difficult (Bates 2010). Each state and territory has its own legislation and regulations directing how their constitutional responsibilities will be delivered.	Limits federal government involvement. Truly ‘national’ national parks, in the sense the federal government establishes them, only exist in Australian territories. Shifting to such an arrangement in the Alps is politically untenable. Cross-border success will continue to be heavily influenced by political support and willingness to collaborate across jurisdictions (Steele et al. 2013).
Biodiversity is a public good, and the communities of interest extend far beyond local stakeholders and the agencies that manage them.	The public interest aspect of biodiversity suggests the current government-centric arrangements, where these agencies can manage for the public good, are likely to persist in tandem with new approaches.
Biodiversity management responsibilities and strategies are strongly determined by land tenure, and the alpine national parks are publicly owned.	Current land tenure of the Alps as national parks is likely to remain unchanged, although the management emphases of the public management agencies may vary over time, and be influenced by politics. Privatization and private ownership is highly unlikely.
Australians have a strong cultural commitment to national parks but conflicts between use and non-use values have been a common feature in the Australian Alps, and public use and perception of the parks have changed over time.	Biodiversity cannot be assumed to have primacy as a park purpose indefinitely, and its valuing by society may change as societal values change.

5.2 Reform mapping

As with the Midlands case study, the move from reform space to mapping potential reform directions involved interrogating good-practice case studies and theoretical literature to identify ways of addressing results from the diagnostic. The reform map for the Alps includes a larger number of options than for the Midlands, inspired by the strong body of case studies and literature on governance designs for protected areas. Options were considered in terms of whether they favor community- or government-based solutions

(Figure 6). The current arrangement (colored orange) lies between the two options pursued in the next stage (colored green), with one option expanding community engagement with park management through informal means (Option 1, One Park One Plan) and the other expanding engagement through a more formal, legislative approach (Option 2, Transboundary Statutory Authority) (Figure 6).

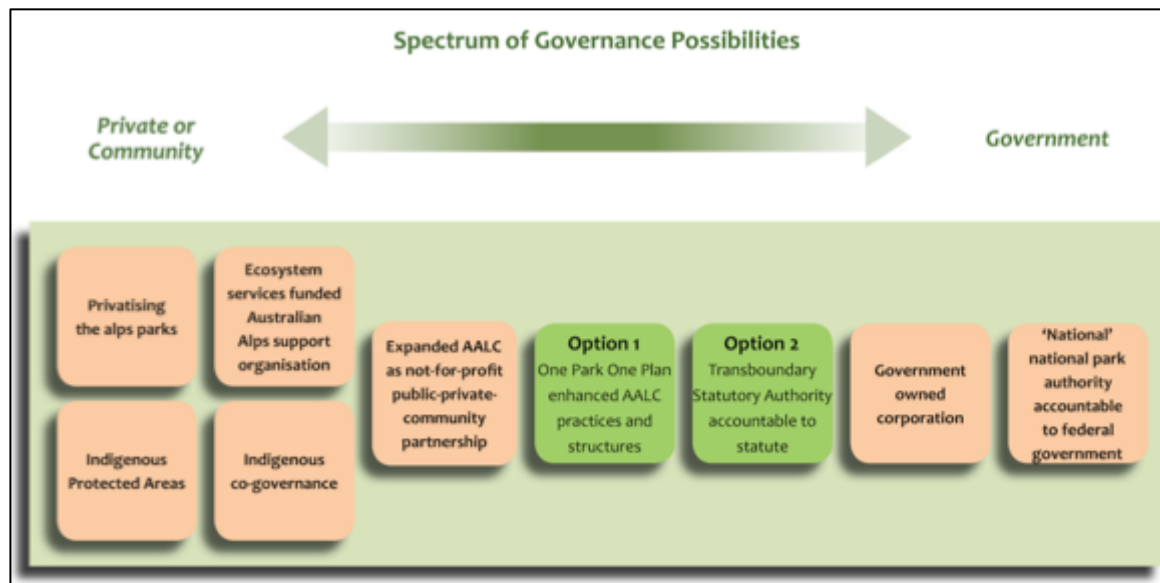


Figure 6 Map of governance possibilities for the Australian Alps²

Although the spectrum of options was broader than for the Midlands, ultimately the two central options were selected and supported by focus group participants because they addressed issues identified in the diagnosis (Table 7), while making the best use of the institutional legacy. The research team initially selected an option that was more toward the community end of the spectrum in Figure 6, but focus group participants thought the two center options to be both more feasible and less likely to generate perverse outcomes. There was very little support in the focus groups for options moving toward public-private partnerships with the tourism industry and community groups, with participants echoing concerns in the literature about their implications for good governance (Eagles 2009).

Landscape-scale conservation emerged inductively as a second aspiration (along with AG) guiding reform design. The need to foster cross-jurisdictional governance was a

² Based on an interpretation of the IUCN's classification of protected area governance (Dudley 2008). The options described in this paper are shown in green.

prominent concern in this government-managed protected area, where large-scale processes (e.g. fire, feral horses, climate change) threaten biodiversity values. It is also in line with ecological critiques that biodiversity institutions are too focused on protecting endangered species, and better biodiversity outcomes could be achieved by adopting larger-scaled approaches (Pasari et al. 2013; Gonthier et al. 2014).

Table 7 Summary of diagnostic results and their implications for reform (Australian Alps)

Strengths	Weaknesses	Implications
<ul style="list-style-type: none"> • Strong history of transboundary cooperation that provides a space for cross-jurisdictional learning and self-organization. 	<ul style="list-style-type: none"> • Program is currently in a lull and collaborative activities are still ‘add-ons’ to core activities of agency managers. • Program activities are strongly influenced by politics within each jurisdiction, impeding a cohesive approach for significant cross-border issues such as fire, feral horses, and climate change. 	<ul style="list-style-type: none"> • Cooperative program provides a strong foundation, but the program is in need of renewal and champions who ensure collaborative activities are supported within the agencies and by governments. • Mechanisms to enable a more cohesive approach on significant cross-border issues are required.
<ul style="list-style-type: none"> • Agencies have intentionally focused on improving capacity to adaptively manage and link actions on the ground to priority assets. Managers demonstrated awareness of what still needs to be done and a willingness to improve. 	<ul style="list-style-type: none"> • In addition to tight government budgets, most funding is tied to specific projects and actions, limiting continuity, innovation and flexibility to adapt. • Accountability mechanisms narrowly focus on how funds are spent and discourage the error-correction mechanisms required for reflexive learning. 	<ul style="list-style-type: none"> • Need for more recurrent funding and diversification of sources to grow and sustain adaptive management capability. • Accountability mechanisms must focus not just on finances and outputs, but also on biodiversity and learning outcomes.
<ul style="list-style-type: none"> • Strong scientific interest in the Australian Alps means high quality research is available to support management. 	<ul style="list-style-type: none"> • Move toward more generalist employees and an erosion of specialist expertise within agencies. 	<ul style="list-style-type: none"> • Need to support scientific research and identify opportunities to better integrate science into decision-making.
Roles and responsibilities are relatively clear in the Alps due to its	<ul style="list-style-type: none"> • Erosion of trust in public agencies has led to more control-oriented structures, constraining mid-level 	<ul style="list-style-type: none"> • Developing a wider coalition of community support for and understanding of parks is

Strengths	Weaknesses	Implications
protected area status.	manager discretion. • Growing influence of anti-park constituencies and associated political pressure disempowers managers and deters them from providing 'frank and fearless' advice.	critical. • Institutions need to devolve sufficient autonomy to let the managers manage. • Need to buffer against political influences and work more productively with these influences.

5.3 Design of reform options

The two reform options for the Alps draw on key findings from applying the diagnostic framework, supported by the literature, and moderated by the results from the focus groups. Both options use the cooperative program as scaffolding, while identifying opportunities to address the weaknesses highlighted by the diagnosis. Focus group participants judged that pathways to achieving the reform options were more important than the final structures, and were keen to build on the strengths of the cooperative program. Focus group participants were also uncomfortable with moving toward options that involved more private partnerships, based on a view that this could compromise the good governance of these publicly-owned protected landscapes. These views informed changes to Option 1, resulting in its movement towards the middle of the spectrum.

Participants saw merit in a statutory authority, given transboundary protection is difficult to achieve without a joint authority based in law (Brenner and Davis 2012), and the potential of such an authority to foster ecosystem-based management and improvements in ecological outcomes (Olsson et al. 2008; Evans et al. 2014). This option was adopted cautiously, given the rocky history of similar statutory authorities in Australia. This made the 'pathway' approach more appealing as well, recognizing that institutional design of a statutory authority for the Alps would need to address the weaknesses seen in other Australian examples (e.g. social learning, community engagement, and addressing social and ecological influences external to the system) (Connell and Grafton 2011; Evans et al. 2014).

As such, the reform options were discussed as potential endpoints to provide a vision of where efforts to build on the cooperative program and enhance cross-jurisdictional cooperation might lead. Both move toward a more cohesive approach; however, Option 1 adopts a more networked structure and attempts to productively use jurisdictional diversity

for intentional experimentation (Sabel and Zeitlin 2010). Option 2 moves toward a more formal approach of a statutory authority, in an attempt to buffer against inter-jurisdictional politics.

Designing governance options for the Alps to achieve a more cohesive landscape-scale approach was complicated by the desire to retain the ‘bottom-up’ legacy of the cooperative program while also building competencies to better deal with cross-border collaboration. Decades of on-ground collaboration have built competency to solve problems at the operational level, giving the cooperative program greater capacity to manage the Alps as a borderless landscape than would be the case with a fully top-down approach (Schoon 2013). Option 2 will thus have to be carefully developed and driven by middle managers within the agencies, and both options require champions to re-invigorate and ensure collaboration is supported by the agencies and successes championed at the political level (Imperial 2005; Thomas 2003; Boyd and Folke 2011). Middle managers, rather than street-level bureaucrats, are the focus because they are where ‘top-down’ and ‘bottom-up’ meet (Fung 2004; Ansell 2011). Such managers would include, for example, district and regional managers, who are both directly connected to the Alps and responsible for ensuring higher-level objectives are met.

Approaches to reshape the accountability dimension of good governance and enable middle manager discretion are central to moving beyond present path dependencies and forming new institutional pathways. The diagnostic findings highlighted narrowly-defined accountabilities, focusing on the financial dimensions and measures that seek to control the behavior of public agencies (Table 7). Seeking greater control to manage risk is a well-known phenomenon in the public service and even NGOs. Control-oriented accountability reduces organizational performance (Salamon and Robinson 2008), blocks reflexive learning and innovation (Ebrahim 2005), and can even deter competent individuals from working for the public service (Behn 2001). Discretion is necessary for solving problems and can facilitate interagency cooperation (Thomas 2003).

Drawing inspiration from the concept of “accountable autonomy” borne out of case studies in public schools and community policing (Fung 2004), both options include strategies to enable middle manager discretion whilst striving for a broader conception of accountability. Accountable autonomy strives to achieve a balance between centralized support and local autonomy to avoid the problems of both extremes, with an emphasis on

building competence to achieve public ends (Fung 2004). Pragmatism suggests cultivating responsibility within agencies as a replacement for narrow, external accountability (Ansell 2011).

In Option 1 (One Park One Plan), middle managers would be given more discretion, but would also be given the responsibility for achieving the goals of the landscape-scale management plan. This model partially decentralizes decision-making to middle managers, where 'top-down' and 'bottom-up' meet (Ansell 2011). Option 2 (Transboundary Statutory Authority) adds a statutory layer over this model, by suggesting the development of a clear purpose and specified biodiversity outcomes and then giving the Authority power to devolve responsibility to lower levels. The Authority would be accountable to these outcomes in legislation, with public reporting mechanisms in the enabling legislation to ensure downward accountability as well as upward accountability. Critically, both options must provide autonomy and cultivate responsibility internally and not just through external checks.

Buffering against external influences, particularly those from the community and political sphere, was identified as a weak area in the diagnosis. The accountability mechanisms outlined above for Option 2 acts not only as a check on regional and local action, but also to buffer against political influences by ensuring too much power is not invested in any one individual, including any one minister. Option 1 approaches this by building more partnerships with community and the tourism industry, as building networks foster organizational conditions to deal with external influences and 'unknown unknowns' (Termeer and van den Brink 2012; O'Toole and Meier 2011).

There is a role for science in buffering and building more adaptive, collaborative institutions. The diagnosis suggests relationships between science and management are already strong in the Alps, but that political pressure and the erosion of specialist expertise within agencies are undermining evidence-based decision-making. Networks of scientists, as epistemic communities with recognized expertise, can exert a strong influence on organizational learning and behavior. In the case of biodiversity conservation in the USA, the level of interagency collaboration was positively influenced by consensual agreement by conservation biologists that achieving conservation outcomes requires cross-jurisdictional collaboration (Thomas 2003). At the same time, these same case studies highlight that "ideas...do not simply become policy" (Thomas 2003; p. 264). Rather, scientific solutions are

most successful when they address political problems, and this is an approach that could be enhanced in the Alps.

Both options recommend the development of a research center focused on the Alps to address these issues, coupled with strategies to attract more diverse funding sources. To address the issues of community disillusionment with some aspects of Australian Alps management (e.g. feral horses), we suggest the development of such a center not neglect the social dimensions of research, which could mean adopting a social-ecological systems approach. Funding will need to accompany such a center, and at the same time there is a need to address the lack of diverse, recurring funding for the Alps. The Authority in Option 2 opens new avenues for funding, as it addresses the problem that the cooperative program is unable to access funding under its current MOU arrangement. With Option 1, the cooperative program may choose to become an incorporated body to address this issue, as has been achieved by several other landscape-scale collaborations in Australia (Fitzsimons et al. 2013). There is no single funding model shown to be 'best' in the literature, but there is a wealth of guidance on how to fund protected areas and access multiple sources of funding (Emerton et al. 2006).

6. Discussion and conclusion

Using insights from pragmatism, we have outlined an approach to designing adaptive biodiversity conservation institutions building on existing competencies as scaffolding for developing capacity and adaptive capacity. We have specifically used pragmatism and congruent concepts in the institutional literature to address the recognized weaknesses of AG such as neglecting the socio-political context and lack of attention to the context-dependency of institutional arrangements (Cote and Nightingale 2012). Throughout this paper we have acknowledged these weaknesses of AG while continuing to pursue it as an ideal, with pragmatism promulgated as a means of doing so. The concept of scaffolding has particularly helped address the importance, in designing reforms, of building on existing institutional elements, while also introducing new institutional elements to address areas where competence is weak.

The pragmatist concept of scaffolding offers an approach to retain the cumulative knowledge embedded in institutions, while also calling attention to the need for large-scale institutional change (Ansell 2011) designed with the goal of AG in mind, where the context is

also taken into account. In the Alps, for example, efforts to collaborate across borders, although offering a basis for institutional development into the future, have reached their limits without more comprehensive changes. To achieve the ultimate goal of an adaptive, landscape-scale approach to biodiversity conservation, the reform options focus on further changes enabling middle manager discretion to decide what to achieve and how to achieve it across borders. Option 2 goes further to establish a cross-border authority unlike others trialed in Australia to date. In the Midlands, the notion of multifunctional landscapes situates biodiversity in a broader landscape matrix and socio-economic context.

By building competence to govern adaptively, and by addressing institutional arrangements that constrain effective biodiversity governance, the reforms aim to improve biodiversity outcomes. These reforms build on the concept of achieving fit between institutions and ecosystems, which is thought to improve ecological outcomes (Lebel et al. 2013; Galaz et al. 2008), and use case study literature to identify areas where institutional change has led to improvements in outcomes. Although these methods are widely used, the causal link between institutions and ecological outcomes remains one of the most difficult challenges in environmental governance (Young 2013). One promising way to examine whether governance reforms can influence key drivers of biodiversity decline is through scenario planning (Mitchell et al 2014; 2015). Review mechanisms have also been built into these options to provide insight into how biodiversity outcomes are changing under reformed arrangements.

In researching approaches to buffering, the organizational change literature provided guidance on how organizations can respond to their institutional environment to ensure continuity and achievement of organizational missions in the face of external influences. This includes building networks, structural changes, fostering leaders that shape the institutional environment, and even using elements of that environment to legitimize action within the existing context (Powell and DiMaggio 1991; O'Toole and Meier 2011). Such strategies can help organizations cope with elements of the institutional environment that are unlikely to change (e.g. political pressure). While institutional entrepreneurs can be a source of change in this regard, this literature often focuses on what made these actors successful (Pacheco et al. 2010), rather than on how they have guided/could guide reform design. Our reforms build on the success of institutional entrepreneurs, who had already helped provide some of the key elements of change, such as re-framing issues and legitimizing the merits of cross-

border collaboration. Further research into how to buffer against external influences at both the scale of organizations and at the scale of governance regimes, and how to better utilize entrepreneurial efforts in institutional design would provide much needed insights for efforts elsewhere.

Reform was also required to pursue the core principles of good governance (Lockwood 2010). Adopting broader notions of accountability was a particularly challenging dimension to address in the reforms because, while there is widespread agreement in the literature that the problem exists, there are few case study examples where accountability reforms were successful. The concept of accountable autonomy (Fung 2004) provided some guidance, with research testing such reforms in a biodiversity governance situation a high priority. The reforms also sought to address fairness, legitimacy, and inclusiveness dimensions by broadening the scope of current conservation in the Midlands, expanding the actors actively engaged in decision-making, and developing options that would need public review or, – in the case of the statutory authority in the Alps and the charter in the Midlands – legislative approval and/or parliamentary oversight.

While the pragmatic approach described here offers practical guidance for designing adaptive biodiversity institutions, there are a few important caveats. Regarding the methods, although the three stages provide a useful guide to operationalizing the process of reform development, in practice there was greater overlap between stages 2 and 3 than depicted in Figure 1. This is because reform development moved back and forth between the diagnostic results and other context-specific considerations, the literature, and focus group data. Regarding the reform mapping, the templates were inspired by depictions of governance models elsewhere, but they are a heuristic to spark discussion and debate, and not the only way to depict reform possibilities. Even within the plausible reform space, the options were constrained by what was in the literature, as well as the known tendency to focus on what is ‘probable’ rather than what is ‘possible’ when developing reform options (Rickards et al. 2014). Researchers using this approach elsewhere could explore ways to stretch thinking about reform options.

There are also many complexities to mapping and designing these reform possibilities that could not be outlined in detail here, with such considerations as the relative power of stakeholders, potential perverse consequences, and likely constraints all meriting attention. It is also important to remember that the process outlined here was experimental.

While both the level of power and authority varied across participants, this process would need to be more inclusive if being applied in a non-experimental context. In particular, reform in private landscapes would require a concerted effort to engage a greater number of landholders, and a greater number of stakeholders with interests in protected areas. Although participants in this study included both individuals and organizations who are already involved and those who are not, the quantum of participants would need to expand to ensure representativeness. Researchers and practitioners elsewhere could follow the same processes, but choose to engage a broader cross-section of actors and conduct a more detailed analysis of specific aspects of reformed arrangements, like power, equity, and legitimacy.

There are also limits to intentional institutional design. The options steer toward two governance designs, but it is important to note that the end result would almost inevitably diverge from that envisioned here. *Bricolage* is a dynamic that creates small changes all the time, and diffusion and translation can lead to more radical changes without deliberate design efforts (Cleaver 2012; Campbell 2010). The dynamics are likely to mirror those described by Djelic and Quack (2007), where even institutional transformation comes about through a long process of incremental steps and a series of interlinked, dynamic, and crooked pathways. The stance taken here is thus more aligned with the concept of path generation, where legacies and path dependencies are important, but not destiny (Djelic and Quack 2007). Interplay between the case study regions and state and national policies add layers of complexity, but also present opportunities to generate new paths at multiple levels. The reforms for both case studies not only seek to influence these other levels, but may ultimately spur new approaches elsewhere.

The end result is also difficult to control, given the options focus on enabling self-organizing, manager discretion, and more community-based approaches to biodiversity governance. A pragmatist approach to institutional change requires giving up on the 'quest for certainty' evident in both traditional and New Public Management literatures (Ansell 2011). This is echoed in the institutional change literature. While innovations can be introduced from the outside, design cannot dictate exactly how institutional elements will be combined in practice (Campbell 2010). Similarly, institutional designers can support reform and create conditions enabling landscape-scale collaboration and a focus on outcomes, but the ultimate outcomes themselves cannot be crafted, particularly in complex

social-ecological systems. Within these limits, the approach to design employed in this research offers a systematic and realistic way to generate new reform pathways and achieve institutional change. Our approach achieves this by using current competencies and institutional legacy as scaffolding, while aiming to build competence to govern adaptively.

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